HOW DOES INDIA'S ENERGY SECURITY AFFECT HER NATIONAL SECURITY?

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India faces formidable challenges in meeting its energy needs and providing adequate and varied energy of desired quality to users in a sustainable manner and at reasonable costs. With a population in excess of one billion, India needs economic growth for human development, which in turn requires access to clean, convenient and reliable energy for all. The keys to energy security are assurance of supply and diversity of sources. As India seeks to secure her energy security needs, it is probable that she will seek to explore new options. The wars in Iraq and Afghanistan have led to spiraling oil prices which have adversely affected the Indian economy. The major impediments to India's ability to secure her energy are inadequate domestic energy capacity, the conflicting interests with China and India's geographic location. The Indian government has followed a policy of resource diversification. Overland trans-national energy pipelines are one of the options being explored by India to meet her energy security requirements. Overland trans-national energy pipelines by their very nature incorporate multiple nations (source nations, transit nations and destination nations) and are affected by regional and geo-strategic interests of the nations involved. Thus, they provide an excellent platform for analysis of India's energy and geo-strategic interests and its security.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

HOW DOES INDIA'S ENERGY SECURITY AFFECT HER NATIONAL SECURITY? By Major Ajay Kumar Singh, Indian Army, 83 pages.

India faces formidable challenges in meeting its energy needs and providing adequate and varied energy of desired quality to users in a sustainable manner and at reasonable costs. With a population in excess of one billion, India needs economic growth for human development, which in turn requires access to clean, convenient and reliable energy for all. The keys to energy security are assurance of supply and diversity of sources. As India seeks to secure her energy security needs, it is probable that she will seek to explore new options. The wars in Iraq and Afghanistan have led to spiraling oil prices which have adversely affected the Indian economy.

The major impediments to India's ability to secure her energy are inadequate domestic energy capacity, the conflicting interests with China and India's geographic location. The Indian government has followed a policy of resource diversification. Overland trans-national energy pipelines are one of the options being explored by India to meet her energy security requirements. Overland trans-national energy pipelines by their very nature incorporate multiple nations (source nations, transit nations and destination nations) and are affected by regional and geo-strategic interests of the nations involved. Thus, they provide an excellent platform for analysis of India's energy and geo-strategic interests and its security. Based on this premise the study shall limit itself to assessing the feasibility of overland trans-national energy pipelines and determining the effects of such pipelines on India's energy security and its national security.

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ACRONYMS

bcm	Billion Cubic Meters
CAS	Central Asian States
IEA	International Energy Agency
IEP	Integrated Energy Policy
IPI	Iran-Pakistan-India
Kcal per Kg	Kilo Calories per Kilogram
MBI	Myanmar-Bangladesh-India
MTOE	Million Tonne Oil Equivalent
Mt	Metric Tonne
MMBD	Million Metric Barrels per day
mmscmd	Million Metric Standard Cubic Meters per day
MWe	Mega Watt Electrical
NCES	Non-Conventional Sources of Energy
ONGCVL	Oil and Natural Gas Commission Videsh Limited
TAPI	Turkmenistan-Afghanistan-Pakistan-India
TERI	The Energy and Resources Institute, New Delhi
USDOE	United States Department of Energy

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CHAPTER 1

INTRODUCTION

India faces formidable challenges in meeting its energy needs and providing adequate and varied energy of desired quality to users in a sustainable manner and at reasonable costs. With a population in excess of one billion, India needs economic growth for human development, which in turn requires access to clean, convenient and reliable energy for all.[1] With an economic growth rate of 8 to 10 percent, the quality and quantity of energy required is bound to increase exponentially in the future. Thus, energy security is a major challenge for India.

It is evident from the Figure 1 (below) that in the period 2004-05, India consumed 120.17 Mt of crude oil products, including refinery fuel. Domestic production has been between 30.3 Mt and 33.98 Mt in the period 1990-2005.[2] This clearly illustrates that domestic production has stagnated. The huge and ever-widening gap between demand and domestic supply has forced India to import most of her energy requirements. India currently imports 72 percent of her energy needs and this import dependence is ever-increasing. The World Energy Outlook published by the International Energy Agency in 2004 projects that India's oil import dependence will grow to 91.6 percent by the year 2020. [3]

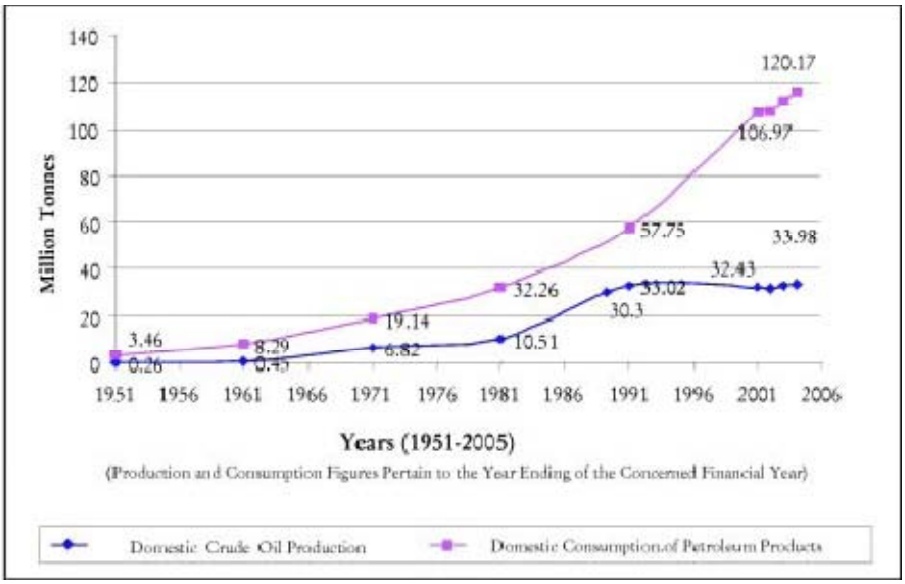

Figure 1. India's Energy Consumption in the Period 1951-2005
Source: Government of India, Planning Commission" Integrated Energy Policy: Report of the Expert Committee, 2006." [On-line] Available from http://www.planningcommission.nic.in/reports.genrep; Internet: (accessed 4 June 2008)

Coal has been the mainstay of India's energy supply for many years. Coal consumption increased from 140 Mt in 1984 to over 400 Mt in 2004 with a growth rate of 5.4 percent.[4] However, Indian coal has a high ash content and low calorific value - an average of 4000 Kcal/kg compared to 6000Kcal/kg in imported coal. Thus, despite large reserves of coal, domestic supply is tailored to barely meet domestic demand. Moreover, it is estimated that at a growth rate of 5 percent in domestic production, currently extractable coal reserves will be exhausted in 45 years.[5]

The keys to energy security are assurance of supply and diversity of sources. In this context, as India seeks to secure her energy security needs, it is probable that she will seek to explore new options. India may well have to explore the option of reducing dependence on traditional energy sources like hydroelectricity, coal and petroleum. The

wars in Iraq and Afghanistan have led to spiraling oil prices which have adversely affected the Indian economy. The other options available to India to address her energy security needs are non-conventional sources like wind and solar energy and nuclear energy. However despite India's attempts to tap the non-conventional sources the problem remains far from resolved due to technological limitations and cost deterrents. As far as nuclear energy goes, despite tremendous progress in this field, the issue of the supply of nuclear fuel is as yet unresolved and does not seem to offer a viable solution to India's energy security challenges. Thus, it can be firmly established that imported energy supply is the key to India's energy security.

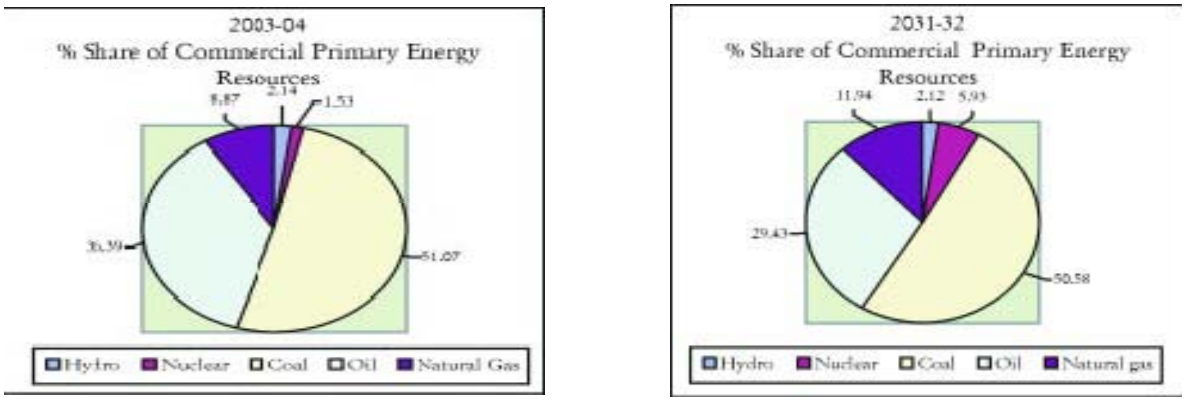

Figure 2. Comparison of India's Commercial Energy Resources in the Period 2003-04 and Period 2031-32

Source: Government of India, Planning Commission" Integrated Energy Policy: Report of the Expert Committee, 2006." [On-line] Available from http://www.planningcommission.nic.in/reports.genrep; Internet: (accessed 4 June 2008)

Figure 2 (above) clearly indicates that natural gas will emerge as a major source of India's energy needs in the near future. Natural gas can replace existing fuels in various sectors both for feedstock as well as for energy purposes. However, this

substitution will depend on the relative price of gas with respect to other fuels. The option of liquefied natural gas (LNG) imports from gulf countries like Oman and Qatar though feasible are plagued with issues of transportation and infrastructure build up. LNG imports entail construction of LNG terminals which pose security risks and are attractive targets for terrorists. In addition to its struggle to secure a reliable energy supply, India is becoming increasingly aware that its economy is highly vulnerable to supply disruptions. It is only very recently that the country has developed an integrated energy policy which entails measures to increase domestic production as well as secure overseas sources. To minimize the effect of global fluctuations, India is building strategic crude oil reserve facility on its Southern and Eastern coasts. Concerned with its growing reliance on oil from the Persian Gulf - 65 percent of its energy is imported from this region - India is now keenly following a policy of source diversification and seeking oil outside the Gulf. Indian firms have invested in overseas oilfields in regions as diverse as Africa (Sudan and Nigeria), Sakhalin in Russia, and Syria. Given the rising preference for natural gas as a feedstock and a fuel, India is also seeking to significantly raise gas imports through LNG and Trans-national gas pipelines. Oil diplomacy is currently being seen as a major tool for ensuring India's energy security along with the acquisition of equity shares in oil and gas reserves overseas.[6]

The two most attractive sources of energy for India are Iran and the Caspian Sea. Increasing attempts to foster friendly relations with the countries of the Caspian region are an indication that India seeks to address her energy issues by tapping into the oil supplies in these regions. To support energy interests in Central Asia, India has already stationed troops in Tajikistan, provided it with a $40 million aid package, and undertook

refurbishment of an air base near the Tajikistan capital Dushanbe.[7] India is also pursuing relations with Kazakhstan and Azerbaijan.[8] However, this foray has the potential to place India in conflict with neighboring China, an economic giant with its own increasing energy requirements, and which views the Caspian Sea region as a solution to its energy needs.

One of the major impediments to India's ability to secure her energy imports are the conflicting interests with China. The recent past has been witness to both countries aiming to secure their energy demands by global investments. There have been instances of Indian and Chinese national oil companies jointly bidding for oil exploration rights in some regions like Africa and Siberia. On the other hand, the same two companies have bid against each other in areas like Myanmar and Venezuela. The Indian failure to secure oil rights in Myanmar, and the fact that Myanmar has given oil rights to China instead, have raised questions about India's ability *' to close the deal'* with respect to securing rights to regional sources of energy. While the Indian view is that these incidents are purely commercial, the economic and diplomatic influence exercised by China to secure her energy interests indicates the potential of clashing interests between the two nations.

The other major impediment to India's achieving energy security is the historical animosity with her Western neighbor - Pakistan. India's ability to access natural gas from Iran and the Central Asian states like Turkmenistan is restricted due to the fact that the pipelines have to pass through Pakistan. Negotiations on these issues will directly impact the sub-regional political and social discourse in South Asia. Since India – Pakistan relations remain the driving force behind political and security issues in South Asia; a

shift in the relationship between these two countries has the potential to change the security scenario in South Asia.

The Indian government has followed a policy of resource diversification. However, this policy has numerous implications that contribute to the difficulties experienced so far. Many of the countries India is dealing with are known for severe violations of human rights. Others are suspected of sponsoring terrorism. Moreover, the enrichment of some oil-supplying countries suspected to sponsor terrorism is contradictory to India's own interests since it is itself plagued by Islamic terrorism.[9]

Thus, it is clear that as India attempts to find solutions to its energy security problems it will face challenges in its worldwide energy search which will have a direct impact on its national security. The purpose of this study is to examine the effects of India's energy security on her national security. The study aims at identifying and analyzing the factors which affect India's energy security and thereafter study the effects these variables have on India's national security.

Primary Research Question

How does India's energy security affect her national security?

Secondary Research Questions

1. What are India's current energy requirements? What are her likely future energy requirements?

2. Is India's energy security an element of its national security?

3. What factors affect India's energy security requirements? How do these factors affect India's national security?

Assumptions

The first assumption on which this study is based is that the Indian economy will continue to grow in the range of 8 percent annually. This growth would then continue to drive energy demands. The second assumption is that India will continue to follow an integrated energy policy to address its energy security issues in both the domestic and international arenas.

Definitions of terms

1. Energy security: In the Indian context energy security at the broadest level is primarily about ensuring a continuous supply of commercial energy at competitive prices to support its economic growth and meet the lifeline energy standards of its households with safe, clean and convenient forms of energy, even if that entails directed subsidies.[10]

2. Natural Gas: 'Natural gas is a gaseous fossil fuel consisting primarily of methane, but including significant quantities of ethane, propane, butane, and pentane—heavier hydrocarbons removed prior to use as a consumer fuel —as well as carbon dioxide, nitrogen, helium, and hydrogen sulfide. It is found in oil fields (associated) either dissolved or isolated, in natural gas fields (non-associated), and in coal beds (as coal bed methane). When methane-rich gases are produced by the anaerobic decay of non-fossil organic material, these are referred to as biogases. Sources of biogas include swamps, marshes, and landfills as well as sewage sludge and manure by way of anaerobic digesters, in addition to enteric fermentation, particularly in cattle.'[11]

3. Mt: Metric Ton (a unit of mass equal to 1000 kg).

4. MTOE: It is a unit of energy. It is the amount of energy released by burning One Tonne of crude oil.[12]

5. Non-Conventional Sources of Energy (NCES). For the purpose of this thesis NCES shall refer to all alternate sources of energy other than oil, petroleum products, hydroelectricity, nuclear energy and natural gas. NCES includes energy sources like solar energy, wind energy etc.

6. MMBD. It is a measure of amount of crude oil produced or consumed by an entity per day. One barrel equals 42 US gallons (158.984 liters).[13]

Limitations

Due to the investigator's limited experience in conducting economic research, the study shall not examine the economic imperatives of energy security. Moreover, due to importance of regional geopolitics on India's national security, the study shall focus on the effect of India's energy security on regional relationships. The investigator's research is also limited by the inability to access official documents pertaining to the energy agreements India has signed with various countries in the past.

Scope and Delimitations

Overland trans-national energy pipelines by their very nature incorporate multiple nations (source nations, transit nations and destination nations). These pipeline projects are affected by regional and geo-strategic interests of the nations involved. Thus, they provide an excellent platform for analysis of a given nation's energy and geo-strategic interests and its security. Based on this premise the study shall limit itself to assessing the

feasibility of overland trans-national energy pipelines and determining the effects of such pipelines on India's energy security and its national security. There shall be no attempt to examine the feasibility of contemporary energy sources like nuclear energy and coal as viable options for India's energy security. The study shall not focus on determining options to solve India's energy security nor will there be an attempt to devise a national security strategy to address India's energy security.

Significance of the Study

The study is significant in understanding the non-military factors which affect India's national security. The study can help understand the role of energy in redefining global geo-political relationships. Though the focus of the study is India, the findings may be broadly applicable to other developing countries. From the strictly military point of view the study is significant since it can provide a better understanding of India's regional and global security issues. It also generates questions of the future role of the military in securing energy interests and infrastructure due to the increased area of interest which can possibly span from the Straits of Malacca to the Persian Gulf and the Caspian Sea.

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[1] Government of India, Planning Commission" Integrated Energy Policy: Report of the Expert Committee, 2006." [On-line] Available from http://www.planningcommission.nic.in/reports.genrep (accessed 4 June 2008).

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Ibid.

[7] Institute for the Analysis of Global Security "India's Security Challenge." [On-line] Available from http://www.iags.org/n0121043.htm (accessed 6 May 2008).

[8] Ibid.

[9] Ibid.

[10] Government of India, Planning Commission" Integrated Energy Policy: Report of the Expert Committee, 2006." [On-line] Available from http://www.planningcommission.nic.in/reports.genrep (accessed 4 June 2008).

[11] Wikipedia" Natural Gas." [On-line] Available from http://en.wikipedia.org/wiki/Natural_gas (accessed 5 June 2008).

[12] Wikipedia" Tonne of Oil Equivalent." [On-line] Available from http://en.wikipedia.org/wiki (accessed 5 June 2008).

[13] Wikipedia" barrel per day."[On-line] Available from http://en.wikipedia.org/wiki/ (accessed 3 November 2008).

CHAPTER 2

LITERATURE REVIEW

This chapter provides a review of the literature and the references used to develop and analyze the main theme of this thesis. The concurrent rise in the national and economic power of India will result in growing energy demands. This would in turn drive an urgent need for India's national policy to ensure energy security. Abundant literature is available in the form of books, government documents, articles in magazines and journals, and on the internet, highlighting the growing role of energy security as a vital element of national security. This is particularly true in the case of major energy importing countries like India. However, there is a lack of adequate literature which analyses and quantifies the direct impact of India's energy security requirements on its national security. The objective of this thesis is to determine how India's energy security affects her national security. It is intended to carry out research based on available material in books, magazines, journals, government publications and internet sources. In the absence of adequate written literature, there is a marked reliance on the internet and electronic media for latest development and inputs to help carry out a realistic and updated analysis of the subject.

The thesis endeavors to examine the energy security requirements of India, both current and in the near future. It also examines the role of energy security as an important element of national security, particularly in case of India with its huge and growing population and booming economy. The thesis further evaluates the available literature to determine the independent variables affecting India's energy security. Having established these factors, the thesis focuses on interplay of these variables to determine their impact

on India's national security. In order to achieve a broad perspective of the problem, the thesis incorporates an analysis of the views of Indian and global think tanks, analysts and writers on this subject. The study aims to arrive at a balanced conclusion with a realistic assessment of the impact of India's energy security on her national security.

Energy Security Requirements of India

Leena Srivastava and Riru Mathur, in their briefing paper on Global Energy Security, analyze India's energy security requirements. Examining in detail the challenge of unmet demands in India, the paper concludes that India continues to face electricity shortages with an overall power shortage of 8.4 percent in 2005-06.[1] The paper also estimates that India would need to increase its primary energy supply by at least 3 to 4 times and its electricity generation capacity by 5 to 6 times the 2003-04 levels by the year 2031.[2] Quoting the Integrated Energy Policy Report of the Planning Commission, the paper also predicts that India's total energy requirements would see a colossal increase and would be in the range of 1536 Metric Tons of Energy (mtoe) to 1887 mtoe by 2031.[3] A report published by The Energy and Resources Institute (TERI), New Delhi indicates that under an 8 percent GDP growth scenario with current plans and policies of the Indian Government, commercial energy needs would increase to 2108 mtoe by 2031.[4] The paper concludes that given the current statistics of energy access and shortages and the likely needs for energy in the future, India faces a formidable challenge in meeting its energy needs.

Mikkal E. Herberg of the National Bureau of Asian Research, Seattle, in his testimony to the United States Senate Committee on Foreign Relations in July 2005 discusses Asia's energy security with particular reference to China and India. The

testimony states that India is the sixth largest energy consumer in the world. It also states that the United States Department of Energy expects Indian coal consumption to rise by 70 percent over the next 25 years to meet the booming electricity demand which is expected to rise by 150 percent in the same time period.[5] Both DOE and the International Energy Agency (IEA) expect Indian oil demand to be amongst the fastest growing in the world, along with China, at nearly 4 percent annually to 2025, rising from 2.1 to 5.3 million barrels per day (MMBD).[6] The DOE expects Indian gas consumption to triple from 0.8 trillion cubic feet (TCF) in 2001 to 2.5 TCF by 2025. The report also establishes that both China and India are scouring the globe to secure better access to oil and gas supplies, and are building diplomatic and trade ties that serve to strengthen these energy links.[7]

Energy Security as a Vital Element of National Security

India's Minister of Petroleum and Natural Gas, Shri M.M.Deora, delivered a speech in the Shell Distinguished Lectures Series at Rice University, in Houston, Texas, U.S.A. on 31st March 2006. During the speech, he defined energy security in the Indian context as the assurance of energy supply to all Indian citizens at affordable cost at all times with a prescribed confidence level considering shocks and disruptions that can be expected.[8] He emphasized that energy security considerations for India require ensuring availability of energy sources through domestic efforts or through buying assets abroad. He also elaborated that energy security has emerged as a primary concern for Indian policy makers because of their nation's increasing dependence on imported energy. The dependence on import of oil causes two main concerns: first is the uncertainty regarding the supply of oil and second is its volatility.[9]

Michael T. Klare in his book, *Resource Wars*, identifies three factors related to energy security which are likely to introduce new stresses in the international system. The three factors identified by Klare are the relentless expansion in worldwide demand for energy, the emergence of significant energy shortages and the proliferation of ownership contests.[10] Klare also discusses the possibility of the risk of conflict between countries that share or jointly claim a given resource deposit. He analyses the possibility of internal conflicts for resources which may lead to instability in the nation state concerned, as well as in the region and the world on the whole.

A.F. Alhaji, from the College of Business Administration, Ohio Northern University, has defined energy security and national security of India in the following words: "Oil and politics are intertwined with one another in an unending dance."[11] In his presentation on energy security of India at the Institute for Defense Studies and Analyses (IDSA), Alhaji states that as the significance of natural gas and LNG in international trade increases, gas and politics will develop a similar relationship. He also indicates that India needs both oil and gas, which puts it at a disadvantage when it negotiates with oil and gas-producing countries. According to him, fear of oil shortages may force India to cooperate with countries with which it would not otherwise cooperate. India's need for oil or gas might force India to make foreign policy decisions that would compromise it on other important issues or principles. Alhaji concludes that while the foreign policy dimension focuses on diplomatic and trade relations, the security dimension deals with two issues: the physical security of energy installations and the energy needs of a nation's military and police to protect the country or quell domestic uprisings, terrorist attacks, or any other violent threat to energy production. Threats to physical security of energy

installations include terrorist attacks, human errors, natural disasters and technical malfunctions.[12]

The clearest evidence of the undeniable relationship between national and energy security is seen in a paper presented by Jaswant Singh, at the Centre for Advanced Study of India, University of Philadelphia, Pennsylvania in 1998. The paper establishes that energy is security; deficiencies in this critical strategic sector compromise national security.[13] In the paper Singh states that the principal global dynamic is now economic, supported by and interdependent with technological innovation. Changes resulting from this new dynamic, global in their effects, nonetheless have differing impacts on different societies, polities and military powers, and on all the other integral components of nations' abilities to safeguard their security

At the ASEAN Regional Forum in 2000, it was proposed that India's security concerns extend beyond the confines of the conventional geographical definition of South Asia. Given its size, geographical location, trade links and the EEZ, India's security environment ranges from the Persian Gulf to the straits of Malacca across the Indian Ocean, including the Central Asian region in the North West, China in the North East, and South East Asia.[14] This analysis is an indicator of the energy security requirements of India dictating its national security concerns.

Independent Factors Which Affect India's Energy Security

Herberg, in his testimony to the United States Senate Committee on Foreign Relations has hinted at energy resource competition between India and China including the Persian Gulf, in Russia and in the Central Asian and Caspian Sea region. He has also indicated that energy security could become a major source of future tension between the

two Asian giants. The testimony also indicates that China and India's growing energy security requirement has broad ramifications for the region across a wide range of geo-political, energy, and environmental issues.[15]

Dr. Mohan Malik, in a report titled *China's Strategy of Containing India* published in the Power and Interest News Report in 2006, has provided valuable insight into the effect of China on India's energy and national security. He claims that both China and India are locked in fierce competition for stakes in overseas oil and gas fields in Asia, Latin America and the Middle East. He also describes India's aversion to Chinese moves to secure oil in Myanmar and the Bay of Bengal. Chinese build up of its naval presence in the South China Sea, the Malacca Straits, and the Strait of Hormuz is likely to prompt India to seek forward deployment of Indian naval assets in Taiwan, Japan and Vietnam.[16] In his comments published by IDSA, J. Nandkumar, drawing on his expertise in strategic relations between India and China, gives an insight on the need to address geo-political rivalry amongst supplier or transit countries, which adversely affects India's trans-border energy transportation plans.[17] In a report published on Rediff.com, Rakteem Katakey claimed that Iran could possibly replace India with China in the $7.4 billion gas pipeline project or go ahead with a two nation Iran-Pakistan pipeline.[18]

Shamila N.Chaudhary has published her views on the implications for conflict resolution nested in the projected Iran to India natural gas pipeline. She claims that the project forces the two countries to reconsider their political discourse and interdependence, especially in light of their energy crisis and desperate need for natural gas resources.[19] She also claims that the final decision on the pipeline route for natural

gas from Iran to India and the role Pakistan plays in that decision will directly impact the development of political and social discourse, foreign policy decisions, security concerns and regional conflicts in Afghanistan and Kashmir, and sectarian violence.[20]

How does India's Energy Security affect her National Security?

The available literature helps identify the various factors which directly impact India's energy security. However, there is a distinct lack of existing literature connecting the independent variables affecting India's energy security with its national security. Despite the fact that most of the analysts and authors on this subject recognize the overbearing influence of energy security on foreign policy and national security concerns, they stop short of drawing out inferences related to India's national security. The thesis shall therefore make an attempt to analyze the interplay of various factors affecting India's energy security on her national security.

Summary

India's energy security requirements are influenced to a great extent by the availability of resources, assurance of supply, and increasing global competition for ever-diminishing energy resources. This chapter introduced the literature that will help analyze the effect of India's energy security on her national security. Besides the published books, articles, and essays mentioned in this chapter, current and ongoing events available through the electronic media and internet will contribute toward the development of the thesis.

[1]Leena Srivastava and Riru Mathur, "India's Energy Security," FES Briefing Paper 14(September2007):2, http:/www.fes.de/globalization (accessed 16 April 2008).

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Mikkal E. Herberg, "Asia's Energy Security, China, and India: Implications for the U.S.," Testimony to The United States Committee on Foreign Relations:9,http:/foreign.senate.gov/testimony/2005/Herberg Testimony050726.pdf (accessed 16 June 2008).

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[8] Shri Murii Deora, "India's Quest for Energy Security: The Oil and Gas Perspective," Presented in the ShellDistinguishedLectureSeries, (31stMarch2006):http://www.rice.edu/energy/events/past/IndiaEnergySecurity_Deora-31st March.doc.pdf (accessed 16 June 2008).

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[10] Michael T. Klare, *Resource Wars* (New York, Metropolitan Books, 2001).

[11] A. F. Alhaji, "The Meaning of Energy Security,"USAEE Blog (August 22, 2006): http://blog.usaee.org/ (accessed 16 June 2008).

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[13] Singh, Jaswant. *What Constitutes National Security in a Changing World Order?* June 1998. http://www.indianembassy.org/pic/js/js (accessed June 16, 2008).

[14] ASEAN Regional Forum, "India," ASEAN Security Outlook 2000:http://www.asean.org/ (accessed 16 June 2008).

[15] Mikkal E. Herberg, "Asia's Energy Security, China, and India: Implications for the U.S.," (accessed 16 June 2008).

[16] Mohan Malik, "China's Strategy of Containing India," PINR:http://www.pinr.com/report.php?ac=view_report-id=634 (accessed 16 June 2008).

[17] J. Nandakumar, “The Need to Enhance Diplomatic Impetus in India’s Global Energy Strategy,” IDSA (August 16, 2007): http://www.idsa.in/ (accessed 30 April 2008).

[18] Rakteem Katakey, “India’s loss may be China’s gain,” Rediff India Abroad (September 28, 2007):http://www.rediff.com/ (accessed 30 April 2008).

[19] Shamila N. Chaudhary, “Iran to India Natural Gas Pipeline: Implications for Conflict Resolution & Regionalism in India, Iran and Pakistan,” TED Case Studies: http://www.american.edu/TED/iranpiprline.htm (accessed 01 May 2008).

[20] Ibid.

CHAPTER 3

RESEARCH METHODOLOGY

The methodology followed for the analysis shall be two-fold. The methodology will first identify India's energy security requirements and determine if India's energy security is indeed an element of its national security. This shall be accomplished by undertaking a qualitative and quantitative analysis of the available literature. Thereafter the thesis shall examine the effects of India's energy security on her national security using the case study methodology. The thesis shall compare three case studies of projected/planned oil and natural gas pipeline to India from different sources and transiting through different countries. Based on the case studies comparison, the thesis will evaluate the impact of India's energy security on her national security. The case studies selected for the thesis are the proposed Iran-Pakistan-India (IPI) gas pipeline, the proposed Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline, and the proposed Myanmar-Bangladesh-India (MBI) gas pipeline.

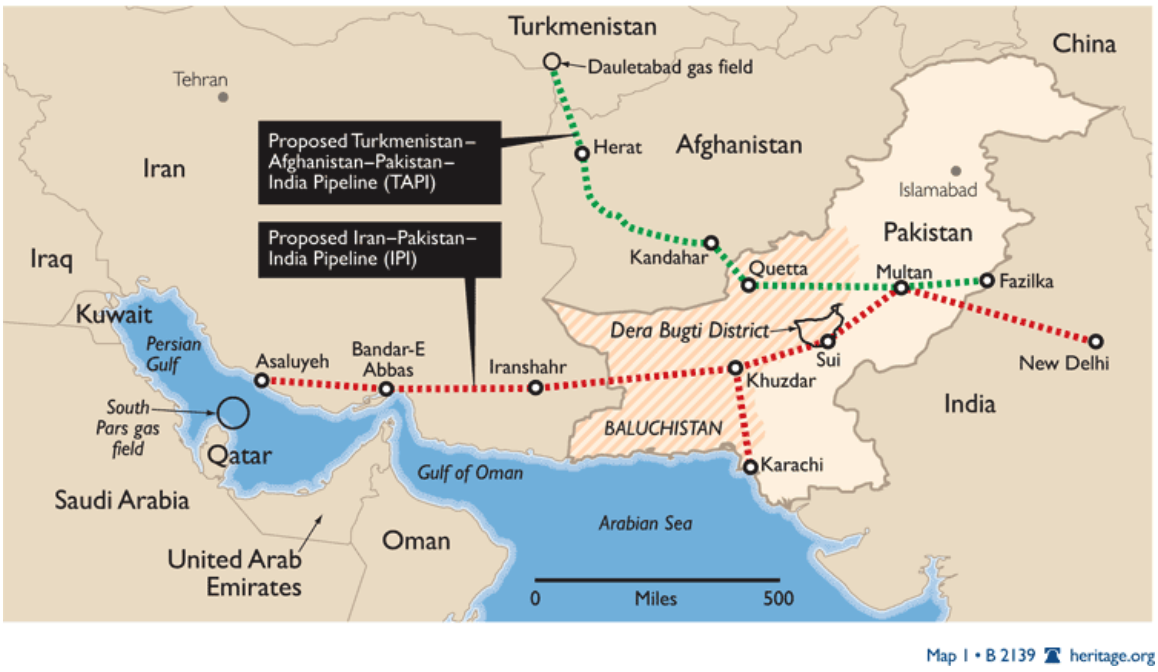

Figure 3. Map of the Proposed Pipelines
Source: Ariel Cohen, Lisa Curtis and Owen Graham, "The Proposed Iran – Pakistan – India gas Pipeline: An Unacceptable Risk to Regional Security," The Heritage Foundation: http://www.heritage.org/Resarch/Asiaandthe Pacific/bg2139es.cfm (accessed 17 September 2008).

These case studies have been selected based on the fact that they are proposed projects identified as possible solutions to India's energy security woes. Moreover all these proposed pipelines have been plagued with various impediments and their implementation has faced considerable delay. All the case studies are potentially relevant to India's national security since they pass through regions/countries which face considerable internal strife and also play a major role in the geo-political stability in the Indian subcontinent region. To highlight this assertion is the fact that two of these proposed pipelines would necessarily pass through Pakistan, India's western neighbor with whom India has had strained relations over many decades.

The analysis of all these case studies in Chapter Four would focus on analyzing the interplay of the independent variables affecting India's energy security in each case. This would facilitate the evaluation of the impact of these variables on India's national security.

Framework for Case Study Analysis

The framework for analysis of the three cases is based upon four independent variables which affect India's energy security and have the potential to affect India's national security. The four variables identified are assurance of supply, role of Pakistan, role of China and finally, the impact of pipeline project on India's relationship with the USA. Assurance of supply is an important variable which has a direct impact on India's energy security. It is closely related to the reliability and stability of the source and also the feasibility of the supply through transit countries. This factor also incorporates the likely causes of supply disruption and their impact on India's energy security.

The next variable identified for analysis is the role of Pakistan in the successful implementation of the proposed pipelines. Pakistan, due to its geostrategic position lies on the route of pipelines to India from the oil rich Middle East as well as the central Asian region. Thus the role played by Pakistan is an essential element of India's success in finding answers to its energy security requirements. The historical animosity between the two nuclear armed neighbors also impacts the feasibility of the proposed IPI and TAPI pipeline projects. Pakistan also probably stands to gain from the projects in terms of revenues. The stability of Pakistan is an important pre-requisite for stability in the Indian sub-continent.

China with its booming economy and huge population is seeking answers to its own energy security concerns. In its search for energy security it is more than likely that there will be a clash of interests between India and China. Both these countries are exploring new horizons both close to home as well as overseas to secure energy. This has led to India to foray into central Asia. On the other hand China has recently secured oil from Myanmar. This is a clear evidence of the possible clash of energy interests with China. In the backdrop of the unresolved border disputes between India and China and their increasing competition for limited global energy resources the role of China in India's energy security is undeniable and needs detailed analysis.

The success of the energy pipelines in addressing India's energy security concerns is not isolated from the impact these pipelines could have on India's relations with other global powers especially the lone superpower, The United States of America. This is especially important in view of the fact that in Iran and Myanmar, India has chosen two sources which are currently mired in controversy. Iran's nuclear ambitions have been the subject of intense international scrutiny and it has also been accused of supporting and sponsoring terrorism. Myanmar on the other hand is ruled by an authoritarian regime and has a dubious human rights record. Thus the search for India's energy security has led it to two sources which possibly could affect its relationship with major global powers especially the USA.

Case Study Selection

The case studies for the thesis were selected based on the premise that they would permit an analysis of the interplay of the four independent variables and their effect on India's energy security and in turn India's national security. India's relations with her two neighbors Pakistan and China undeniably affect India's national security. Based on this the IPI and TAPI pipeline projects were selected since they directly involve Pakistan and thus facilitate the study of the effect of the two projects on India – Pakistan relations. Moreover the two pipelines also indirectly involve China since China may also have interests in securing energy supply from Iran and the Central Asian region.

The MBI pipeline on the other hand is a case where China is directly involved since it has managed to secure the oil and gas rights from Myanmar at India's expense. Moreover this project enables China to develop ports and infrastructure in the Bay of Bengal thus raising concerns for India.

The case studies have also been selected keeping in mind the fact that in two of the three cases the pipelines originate in countries which are the mired in international controversy. In the case of the IPI pipeline the originating country Iran has been accused of sponsoring terrorism and also having ominous nuclear ambitions. In the case of the MBI pipeline the originating country Myanmar has been accused of human rights violations. Both Iran and Myanmar share strained relations with the USA. On the other hand Indo-US relations are at an all time high. Hence these projects have the potential to affect India's relations with the USA.

The following chapter shall initially focus on determining the energy requirement of India and examining whether India's energy security is an element of its national

security. Thereafter the focus shall be on analyzing each of the case studies within the framework of the independent variables identified herein and assessing their impact on India's national security.

CHAPTER 4

ANALYSIS

This chapter is divided into two parts. The first part shall focus on the qualitative and quantitative analysis of primary and secondary literature in order to determine India's energy security requirements and to determine whether India's energy security is an element of its national security or not.

Having established energy security as an element of India's national security the second half of this chapter shall adopt the case study methodology. The analysis shall be based on three pipeline case studies which are the IPI, TAPI and MBI pipelines. The analysis of the pipeline case studies shall be conducted within the framework of four independent variables and factors: assurance of supply, the Pakistan factor, the China factor and effect on relations with the USA. The case study analysis shall focus on determining the effect these variables could have on India's energy security. Thereafter, the analysis shall determine the effect of these independent variables on India's national security.

India's Energy Security Requirements

India is a growing economy faced with an enormous energy security challenge. With the population in excess of one billion, India's appetite for energy, both commercial and domestic, is growing. Currently India has the sixth largest energy demand in the world.[1] With a stable economic growth rate of 8 percent over the last two decades, which is likely to be maintained in the near future, the demand for energy in India is only bound to increase in the future. The problem is compounded by India's relatively inadequate

domestic energy production capacity (refer Figure 1). The Integrated Energy Policy report brought out by the Planning Commission of India estimates that under an 8 percent GDP growth scenario, India's energy security requirements would be in the range of 1536 MTOE to 1887 MTOE by 2031.[2] This clearly indicates that India's energy requirements are bound to increase manifold and require to be addressed at the earliest possible time. The estimates by agencies like the US DOE have also projected a colossal rise in India's electricity demand over the next two and half decades. As per DOE estimates, Indian coal consumption is expected to rise by 70 percent over the next 25 years to meet electricity demand which is expected to rise by 150 percent.[3] Both DOE and IEA predict Indian oil demand to be amongst the fastest growing in the world, along with China, increasing nearly 4 percent annually through 2025, rising from 2.1 to 5.3 MMBD.[4] The DOE has also predicted India's gas consumption to triple from 0.8 TCF in 2001 to 2.5 TCF by 2025, driven by the growing need for energy.[5]

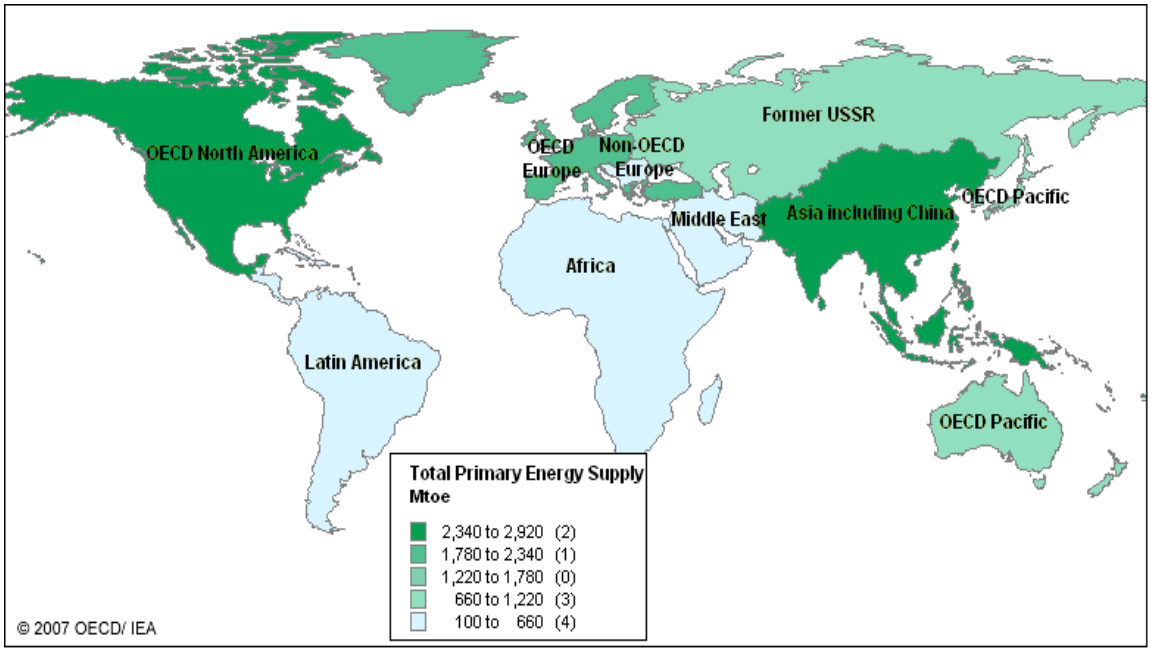

Figure 4. Map Energy Indicator1 - Total Primary Energy Supply 2005
(Total Primary Energy Supply: Indigenous production + imports - exports - international marine bunkers ± stock changes)
Source: IEA Statistics, 2007 (accessed 21 November 2008).

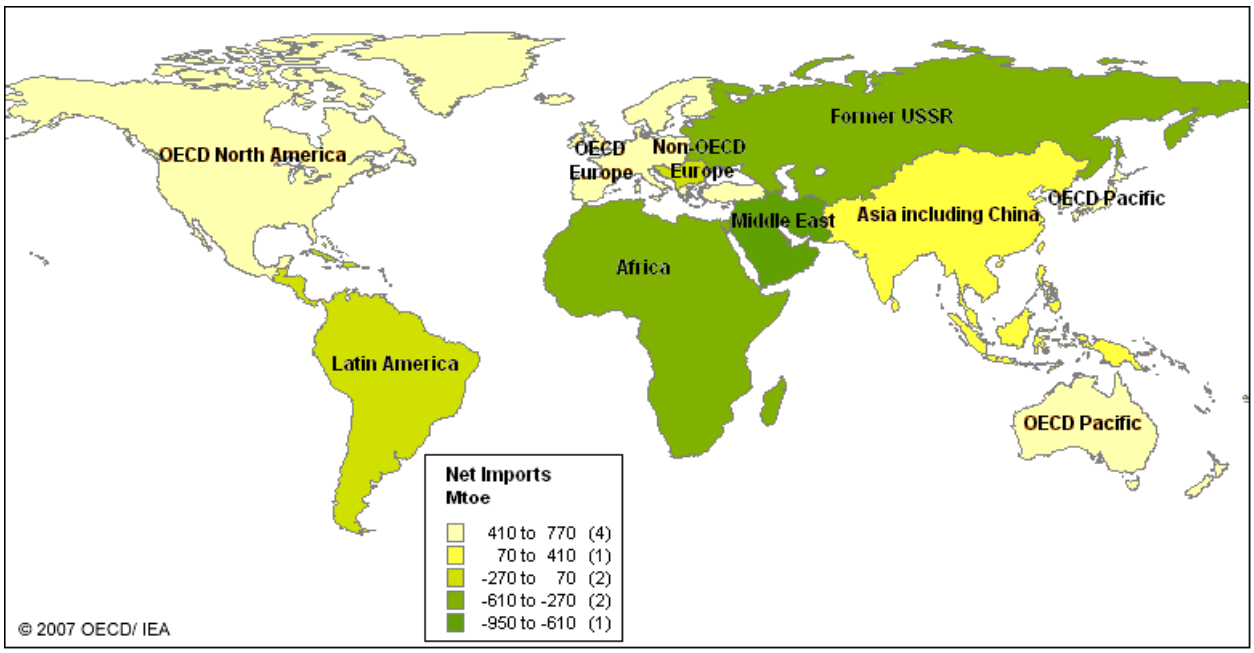

Figure 5. Map Energy Indicator 2 - Net Imports 2005
(Net Imports: Imports minus exports for total energy. A positive number denotes net imports, and a negative number denotes net exports.)
Source: IEA Statistics, 2007 (accessed 21 November 2008).

The above map energy indicators released by the IEA in 2007 clearly indicate that India and China have a significant primary energy demand and consume a major portion of the world's energy imports. India's growing energy requirements are also evident from the findings published in the document titled *'India Hydrocarbon Vision – 2025'*, a document published by the Indian Ministry for Petroleum and Natural Gas.

Table 1. Demand-Petroleum Products in India (in Million MetricTonnes)

Year	Demand (without meeting gas deficit)	Demand (with meeting gas deficit)	Estimated refining capacity	Estimated crude requirement
1998-1999	91	103	69	69
2001-2002	111	138	129	122
2006-2007	148	179	167	173
2011-2012	195	195	184	190
2024-2025	368	368	358	364

Source: Hydrocarbon Vision 2025, Ministry of Petroleum and Natural Gas, Government of India, 2000 (accessed 21 November 2008).

The above table elucidates the projected supply demand scenario of petroleum products in India up to the period 2024-2025. In fact, it is estimated that in the next two decades oil would replace coal as the mainstay of energy supply in India (refer Figure 2). However, as has been indicated in the IEP report there has been a stagnation of domestic oil production (at around 33 MT) in the last few years.[6] It is also estimated that there will be a significant increase in the reliance on natural gas as a source of energy supply.

Table 2. Demand of Natural Gas in India

(In million standard cubic meters per day)

YEAR	DEMAND
1999-2000	110
2001-2002	151
2006-2007	231
2011-2012	313
2024-2025	391

Source: Hydrocarbon Vision 2025, Ministry of Petroleum and Natural Gas, Government of India, 2000 (accessed 21 November 2008).

The above table shows the projected demand of natural gas up to the period 2024-2025. However, despite the emergence of natural gas as an option and the discovery of gas reserves in the Krishna-Godavari basin in India, it is estimated that the level of indigenous production will simply not suffice. India currently imports 72 percent of her energy requirements with the majority of the imports coming from the Middle East.[7] As per TERI it is estimated that by 2031 there will be a 78 percent dependence on imported coal, 93 percent dependency on imported oil and 67 percent dependency on imported natural gas, as India strives to meet her energy security requirements.[8] Overall import dependency for energy would be around 80 percent by the year 2031.[9]

Analysis**.** It is evident that India's insatiable energy demand is bound to grow commensurate with the growing electricity and energy requirements within the country. The demand for energy cannot be adequately addressed by domestic production and hence, India will have to explore overseas options to meet its energy security

requirements. More significantly the analysis indicates that India's vast energy requirements cannot be addressed by any singular source. India in fact has to rely on an energy mix in order to meet its energy security requirements.

India's Energy Security as an Element of Its National Security

In the Indian context, energy security can be defined as the availability of commercial energy at competitive prices to support its economic growth and meet the energy needs of its citizens.[10] The widely accepted principles of energy security are assurance of supply, diversity of sources and low price volatility.[11] In the Indian context, the huge reliance on energy imports makes it difficult to obviate supply risks and hence it becomes difficult to ensure supply in the long run. The Middle East being the primary source of India's energy needs violates the principle of diversity of sources. As has been evident from recent world oil prices, the price volatility of oil is adversely affected by fluctuations due to international conflicts, which in turn impacts the cost of energy imports for India. The second and third order effects of this price volatility are evident on the social dimension in India, in that the increased burden on the exchequer precludes the government from spending on social upliftment schemes and programs.

Dimensions of Energy security. Analysts like A.F.Alhaji have postulated that there are six dimensions of energy security: the economic dimension, the social dimension, the foreign policy dimension, the environmental dimension, the technical dimension, and finally the security dimension.[12]

The Economic Dimension. This is the dimension wherein the economic growth is related to energy security. In countries like India where the relationship between economic growth and energy security is directly proportional, any threats to the energy supply adversely affect its economic growth. There is a concurrent adverse impact on the inflation rates, unemployment rates and the balance of payments.[13] Thus it becomes apparent that there is a need to integrate energy security with economic and fiscal policies in order to mitigate these effects.

The Social Dimension. It is widely accepted that energy security of India is directly affected by the security of supplies and political unrest in the oil producing countries. However, the impacts of energy security on the domestic political problems are largely not accounted for. It is important to understand that in a country like India, where a third of the population lives below the poverty line, inadequate energy supply has the potential to create a social divide between the energy rich and the energy poor.[14] This in turn can lead to social tensions and weaken the social structure. Thus, it is evident that the larger the energy gap, the more insecure is the country.[15] This indicates that energy security has a direct impact on the national security of India.

The Foreign Policy Dimension. There are numerous indicators that oil diplomacy is an essential element of India's foreign policy as it strives to secure energy from as diverse sources as possible. Moreover, as is indicated by the IEP report of the planning commission, natural gas is increasingly being used as fuel and feedstock for energy generation. Thus, gas and oil diplomacy in India are now essential elements of its energy security. Analysts like Alhaji have predicted that India's

need for oil and gas may shape its foreign policy dimensions, forcing it to deal with countries it may not deal with otherwise. The clearest indication of the enormity of this dimension is seen in the Hydro-carbon vision 2005 wherein the stipulated objective of Indian policy makers is to ensure energy security for the country keeping in view the strategic and defense considerations.[16]

The Security Dimension. This dimension deals with the physical security of energy installations and the energy needs of a nation's military and police to provide secure domestic environment and quell any threat to energy production.[17] As India strives to achieve energy security, it is building up a strategic reserve of energy on both its eastern and western coasts. In addition, India is also building up LNG import terminals at major ports and harbors in order to facilitate import of LNG from countries like Qatar and Oman.[18] Moreover, the Government of India has approved plans for developing twelve additional import terminals.[19] This entire infrastructure poses potential targets for terrorist attacks. The added requirement for energy consumption by the Indian security forces, ensuring energy supply to these forces and speed of delivery of energy to them, is an unavoidable element of India's energy security as it stands today.

The Environmental Dimension There is enough evidence that energy security and the environmental impact of the production and consumption of energy sources are intertwined. Indian policy makers have stressed the use of better technology to explore and produce energy while achieving minimal adverse impact on the environment. However, the problem lies in the fact that clean technologies add to the cost of energy exploration and production and are not always a feasible option

for India.[20] Increased cost of energy means an adverse impact on the social and economic dimensions of the energy security. An example of this is that if energy prices are increased in India through taxes and additional costs, energy would be inaccessible to the lower income families in India.[21] They will be forced to burn wood, coal and animal dung which will lead to deforestation and increase pollution.[22]

The Technical Dimension As India strives to achieve energy security, one of the areas of emphasis would be to utilize modern technology not only for environmental concerns, but also for harnessing the vast untapped potential of NCES. However, since these technologies are in the nascent stages of development and have huge costs associated with them, they would adversely impact the economic dimension. Moreover, increased reliance on the technology to develop and exploit NCES may actually lead to energy insecurity because there would be an increase on reliance on imports for spare parts and technology.[23]

Michael T. Klare in his writings has predicted an enormous mismatch between global supply and demand of energy resources, fueled by the enormous increase in demand in India and China.[24] Quoting the US DOE, Klare has predicted that oil consumption in the developing world will increase by 96 percent between the periods 2001 to 2025.[25] In the case of India, there is expected to be an unprecedented 152 percent increase in oil consumption in the same period.[26] Weighing this surge in demand against the limited supply sources in the Middle East, Nigeria, Russia and Venezuela, it seems inconceivable that this huge supply demand gap can be bridged in the future.[27] In his testimony to the

US Senate, Herberg has hinted at a growing clash of interests between India and China as they seek to secure their energy requirements.[28]

In his book *Resource Wars*, Klare has stated that it is impossible for any government, especially in thriving democracies like India, to ignore energy security and have domestic political and social stability.[29] Klare, in his article *The Intensifying Global Struggle for Energy,* has quoted the current Indian Prime Minister as saying "I find that we have fallen behind China in planning for the future in the field of energy security."[30] Klare has also hinted that once this happens and Generals plan for contingencies and emergencies, there then emerges the possibility of small incidents evolving into crises and crises into wars.[31]

Analysis. Logically it may be questioned as to why energy security should be so important to a nation. The answer lies in the second and third order effects created by energy insecurity as has been discussed in the analysis of the six dimensions of energy security earlier in this chapter. It can be safely assumed that in this age of information networking, citizens in countries like India will invariably question their government's failure to secure their basic needs – and energy is central to all basic needs. The growing demand of energy in developing countries like India and China cannot be met by the dwindling resources of oil in some of the major oil producing countries like Saudi Arabia.

Having established the fact that there is indeed a race to secure energy resources due to the supply demand gap, there emerges the distinct possibility of national interests clashing as nations strive to secure their energy requirements either through source diversification or through purchase of oil and gas supply rights from major oil and gas

producing countries. Moreover as India seeks to deal with countries like Iran and Myanmar to secure gas supply, her relations with the USA could also be possibly adversely affected. The enormity of energy security has grown to such an extent that in India the government has taken it up on itself to develop and pursue a policy to achieve energy security. It is possible that as energy security today is such a massive concern in India, it may well pass from the realm of economics and statecraft into that of military policy.

From the above assessment it is evident that India's energy security is undeniably an essential element of its national security and shall continue to be so in the foreseeable future. In this context it is pertinent that an analysis be made to study the effects of India's energy security on its national security.

Case Study Analysis

In the first half of this chapter it has been established that India's energy security requirements necessitate reliance on energy imports to meet her growing energy demand. More significantly, it has also been established that India's energy security is an essential element of its national security. This part of the chapter shall focus on determining the effects of India's energy security on her national security. There shall be an analysis of the three selected case studies – the IPI, TAPI and MBI natural gas pipelines. The framework of the analysis shall be four variables – assurance of supply, the Pakistan

factor, the China factor and the effect on India's relations with the USA. The analysis shall first focus on determining the effect of these variables on India's energy security. Thereafter, the analysis shall determine the effect these variables have on India's national security.

The Iran – Pakistan – India (IPI) Natural Gas Pipeline

Iran has the world's second largest reserves of natural gas, holding up to 9 percent of the world's total reserves.[32] Though it has a huge domestic demand there is a requirement for Iran to explore new markets to export its gas in order to bolster its economy, which has seen a downturn due to protracted United Nations sanctions. In contrast India has inadequate natural gas reserves. Moreover, the demand for natural gas as a major source for energy is increasing manifold in India. It is expected that demand for natural gas will see an annual increase of 8 percent as India strives to achieve its energy security.[33] Thus, it was a logical step for Iran and India to explore the option of energy trade in order to mitigate their respective problems. The fact that Pakistan also consumes more natural gas than it produces resulted in its exploration of the Iranian option. Thus, there emerged the conditions for the proposal to build the IPI natural gas pipeline. The Iranian government proposed the construction of a pipeline from its South Pars fields to Pakistan's major cities of Multan and Karachi and then onto Delhi in India.[34]

Figure 6. Map of Proposed Route of the IPI Natural Gas Pipeline
Source: TED case studies, 2001 (accessed 01 May 2008).

The above map shows the pipeline's main route. The pipeline would originate in Asaluyeh, Iran, on the coast of the Persian Gulf near the Iranian South Pars fields. From there it would travel to Khuzdar, Pakistan, with one section going on to Karachi, Pakistan, and the main section travelling to Multan, Pakistan. From Multan the pipeline would travel east to Delhi, India. The proposed pipeline, dubbed as the peace pipeline, would be 2,775 Km long with a 48 inch diameter and would require $7.5 billion to construct.[35] The pipeline has the potential to export 150 million metric standard cubic meters per day (mmscmd) to Pakistan (60 mmscmd) and India (90 mmscmd).[36] Similarly, India stands to benefit tremendously from the pipeline project in terms of

saving valuable foreign exchange. Despite the tremendous benefits the project has not materialized due to various political and security concerns. Recently, pricing issues have also plagued the project.

Effect on India's Energy Security.

- Assurance of supply. The analysis in the first half of this chapter has already amplified that diversity of resources and assurance of supply are key elements of India's initiatives to achieve energy security. In pursuance of this policy India views Iran as one possible source of energy. This would reduce India's dependence on oil from the unstable Middle East region as the primary source of energy imports. Moreover, the import of energy across the high seas is also vulnerable to supply disruptions. This pipeline will provide 90 mmscmd of natural gas as against a projected demand of 391 mmscmd of natural gas in the period 2024-2025.In this context the proposed IPI pipeline has the potential to provide assurance of supply in conjunction with other energy sources.
- The Pakistan factor. Geographical considerations dictate that the energy pipeline from Iran to India has to pass through Pakistan. Thus, Pakistan has a key role in India's efforts to access energy from Iran. Chaudhary has also reported the Indian government's initial reluctance to enter into the project due to a historically tense relationship with Pakistan.[37] India's proposal for a deep sea pipeline to obviate the security threats related to the project was ruled out due to the extremely high cost (four times the cost of the overland pipeline) involved. In her study,

Chaudhary has also indicated the concerns expressed by the Indian government with respect to whether Pakistan could guarantee security for the pipeline within its territory. This was primarily due to the fact that 475 miles of the proposed pipeline will pass through the poor, unstable region of Balochistan in Pakistan.[38] This separatist region of Pakistan has tribes with private armies who are reportedly dissatisfied with the federal rule. The Indian concerns were laid to rest by the Pakistani energy minister's assurances in July 2000 that the security of the pipeline was of utmost concern and would be a top priority.[39] Pakistan could earn as much as $500 million in royalties as transit fees and save up to $200 million by purchasing cheaper gas from the pipeline project.[40]

- The China factor**.** China's huge energy appetite is undeniably leading it to pursue policies in support of achieving energy security by exploring new sources for its energy supply. In an article published in the Heritage Foundation website, Ariel Cohen, Lisa Curtis and Owen Graham have reported that there is evidence to indicate China's interest in Iran as a source for energy supplies.[41] The article reports that the last few years have witnessed a tremendous increase in China's investment in energy, military, and geopolitical relations with Iran. In this article Cohen has stated that China has expressed its willingness to replace India in the IPI pipeline.[42] The same views were also expressed in a news report titled *India's Loss May Be China's Gain*, published on Rediff.com.[43] Citing Iranian officials, the report has speculated that in view of India's unwillingness to move forward on the pipeline and in context of China's growing interest in the project, the Iranians were considering roping in China to replace India. The pipeline could be taken

through the Karakoram Pass from Multan into China. Alternatively , the pipeline could terminate at the currently being developed port of Gwadar, from where oil could be taken overland over the proposed Pakistan – China Karakoram highway or be shipped to China.[44]

- Effect on relationship with the USA**.** The USA has tried to dissuade India from participating in the IPI pipeline. This is in context of the fact that the USA considers Iran to be a sponsor of terrorism as well as having a rogue nuclear program. However, India has expressed its desire to proceed with the project citing its own energy concerns. Many see the recent US endeavors to provide India with the nuclear option as a measure intended to steer India away from the IPI pipeline. In his article Cohen has postulated that the IPI pipeline is in fact a source of regional instability due to the financial benefits to Iran.[45] In fact, he has proposed that the US should diplomatically discourage India from participating in the project and instead help India develop the LNG and nuclear options instead.

Analysis**.** The IPI pipeline has tremendous potential to mitigate India's energy security problems. Natural gas has inherent advantages as a viable source of energy supply and also addresses environmental concerns due to the comparatively environment-friendly natural gas power plants. The tremendous cost benefits of the IPI pipeline also serve India's requirements of accessing cheap energy. The pipeline adheres to India's requirements to achieve source diversification. It increases the possibility of exploiting natural gas as an alternative to oil or other traditional sources of energy supply. Moreover, the pipeline provides India with a viable alternative to oil imports from the Persian Gulf. By avoiding the transportation of energy through the Straits of Hormuz and

across the oceans it reduces the possibility of supply disruptions. The analysis also clearly indicates that the stability of Iran is a critical factor in the success of the pipeline in providing assurance of supply to India. The fact that the pipeline has to pass through Pakistan adds another dimension to India's energy security problems. In essence, it establishes Pakistan as a key player in India's energy security. The internal stability of the region in Pakistan falling along the pipeline route is central to Pakistan's ability to provide security to the pipeline. Thus, it could be said that internal stability of Pakistan is also a critical factor in the IPI project's ability to provide assurance of supply to India.

The growing Chinese interest in Iran as a strategic source of energy supply further complicates the issue. The fact that China has expressed their desire to replace India in the pipeline indicates the clashing energy interests of both the countries. The Chinese investments in Iranian gas and oil fields, and its collaboration in the development of Gwadar Port in Pakistan, are both indicators of the fact that India can no longer disregard the growing impact of China on India's energy security.

Effect on India's National Security.

- Assurance of Supply The fact that assurance of supply is indeed a critical element of energy security has already been established. In the case of major energy importing economies like India assurance of supply is thereby indirectly tied to the national security. Assurance of supply involves a multitude of measures, like diversity of sources and security of critical energy installations at home and abroad. In pursuit of assurance of supply India has adopted a policy of source diversification. This has translated into an increase in investments in oil and gas

fields in areas across the globe. The IPI pipeline is also a direct fallout of this policy. Security of this pipeline at home and abroad would thus be of critical concern to India.

Another key interface between assurance of supply and India's national security is in the domestic socio-economic realm. Writers like A. F. Alhajji and Michael Klare, in their various articles on energy security, allude to the fact that the failure of governments to provide energy security to its citizens has tremendous second and third order effects. Energy insecurity has the potential to create domestic social problems. It can lead to social division between energy 'haves' and 'have-nots.' In the case of India, where a third of the population lives below the poverty line, the effects of such a social rift can be devastating. The IPI pipeline, with its potential to provide cheap access to energy, has the potential to mitigate the problems resulting from energy insecurity. Shamila N. Chaudhary, in her analysis of the regional impact of the IPI pipeline, has indicated the vast potential the pipeline provides in alleviating the energy woes in rural India.[46]

- The Pakistan Factor According to Shamila N.Chaudhary, '*The Peace Pipeline'*, as this IPI pipeline is being popularized as, has the potential to change the face of regional politics in South Asia.[47] It is a study in how economic collaboration could alter social and political discourse between India and Pakistan.[48] In light of the fact that there is a history of three major wars between the two neighbors, trade in the form of a natural gas pipeline could well serve as a catalyst for improved relationship between the two nations. Chaudhary also says that the pipeline has the potential to alter the very face of South Asian politics. This is

based on the premise that the relationship between India and Pakistan has dominated the face of political discourse in Southeast Asia.[49] The fact that Pakistan in the past has avoided major economic collaboration with India is also set to be historically altered if this project meets reality. Chaudhary alludes to the fact that given the tense multi-dimensional relationship between the two countries, an agreement on the pipeline project could well be historical. The only other successful bilateral agreement between the two countries pertaining to resources is the Indus Water Treaty of 1960.[50]

The most contentious dispute between the two countries has been the long and unresolved Kashmir problem. According to Chaudhary, the hostile political and social discourse between India and Pakistan over Kashmir is possibly going to be challenged by the emergence of this ambitious project.[51] In context of the current energy crises in the two countries and their desperate need for energy resources, the IPI project would force policy makers in the two countries to reconsider their political discourse and interdependence.

- <u>The China Factor</u> The IPI project has the potential to influence India's national strategy based on the fact that Chinese and Indian national interest could potentially clash due to China's overt willingness to replace India in this project. The extension of the pipeline to China entails infrastructure development in the form of a pipeline passing through the strategic Karakoram Pass or the construction of the Karakoram highway. This has important national strategic implications for India since the Karakoram Pass lies in what India claims to be 'Pakistan occupied Kashmir'.

- Effect on relationship with the USA The very fact that India plans to develop a pipeline from Iran in order to import natural gas is contrary to the US efforts to isolate the hard-line regime in Tehran. Michael Klare, in his article titled *The Intensifying Global Struggle for Energy*, highlights Washington's opposition to the project. He quotes US Secretary of State, Condoleezza Rice, as having said, "We have communicated to the Indian government our concerns about the gas pipeline cooperation between Iran and India."[52] The Indian foreign minister's reply that "we have no problems of any kind with Iran" indicates the diverging views of both countries on this issue. [53]Thus, the pipeline has the potential to sour the growing relations between the world's oldest and largest democracies, USA and India, respectively.

Analysis**.** The IPI pipeline has the potential to tremendously impact the energy security of India. The fact that it would provide cheap energy to energy hungry India would help mitigate India's energy security woes. Moreover, it is also in accordance with India's energy security policy by providing diversity of source and assurance of supply.

The impact of the IPI pipeline on India's national security is even more significant. On the positive side, the pipeline has the potential to alter the relationship between India and Pakistan. It could very well be the conduit for improved dialogue between the two neighbors and prove to be the source of dispute resolution. On the other hand, the pipeline has the potential to bring India's national interests on a collision course with that of its Asian neighbor, China. This is significant due to the fact that there is an unresolved boundary issue and territorial disputes between the two Asian powers. Thus, clashing national interests between India and China could be magnified due to the

complex political relations and other disputes between these two countries. Finally, the pipeline has led India on a potential ideological clash with the world's sole superpower, the USA. Despite the emerging ties between the two countries, India's desire to seek answers to its energy security woes by implementing this project could possibly frustrate US efforts to economically isolate Iran. Many in the US would argue that India, which is itself a victim of Islamic terrorism, is ready to negotiate with Iran which is suspected to sponsor terrorism.

Turkmenistan – Afghanistan – Pakistan – India (TAPI) Natural Gas Pipeline

The existence of vast gas reserves in the Caspian Sea basin and the recent discovery of new gas reserves in Turkmenistan have made the CAS region a viable source for gas supply to India. The TAPI project was originally conceived as a three nation project between Turkmenistan, Afghanistan and Pakistan. Consequent to the keen interest shown by India the project was extended to India.

Figure 7. Map of Proposed Route of the TAPI pipeline.
Source: Canada Centre for Policy Alternatives, Vol 3, No.1, June 2008 (accessed 21 November 2008).

The pipeline will start from the Dualatabad gas fields in Turkmenistan and on to Afghanistan. Here it will run along a highway from Heart to Kandahar and then on to Quetta and Multan in Pakistan. The pipeline will finally terminate in the Indian border town of Fazilka. The 1680 km long pipeline is initially expected to carry 27 billion cubic meters (bcm), of which 2 bcm will be purchased by Afghanistan and 12.5 bcm shall be supplied to both India and Pakistan.[54] The capacity is expected to be increased to 33 bcm subsequently.[55] The cost of construction is expected to be about US$7.4 billion and the project is expected to be completed by 2014.[56] The Asian Development Bank is financing the entire project. The project has received a major impetus with the recent announcement by the Afghan government that it is going to clear up landmines along the TAPI route.[57]

Effect on India's Energy Security

- Assurance of supply. The pipeline would serve India's interests in addressing its energy security concerns. Not only would it provide much needed energy to India it will also be in synergy with India's policy of source diversification. It will open up India's option to access energy from the CAS states. It will also reduce India's reliance on oil imports and thus reduce dependency on the Middle East and Persian Gulf. However, the overriding concern as far as India is concerned would be the internal stability of the region through which the pipeline passes in both Afghanistan and Pakistan.
- The Pakistan Factor. The geographical constraints entail that the pipeline has to pass through Pakistan to reach India. This establishes Pakistan as a key player in India's energy security. Concerns have been expressed about the security of the pipeline, as it will traverse through politically unstable areas of Afghanistan and Pakistan. However, the economic benefits for Pakistan are tremendous; hence, it has a vested interest in the success of the pipeline project. Pakistan stands to gain economically through getting access to cheap gas. Moreover, it also could earn valuable revenue through transit fees. In addition, the project has the potential of creating additional employment opportunities in the relatively undeveloped North Western regions of Pakistan.[58] These benefits for Pakistan augur well for the success of the project. Overall, the pipeline would strengthen economic ties between the two neighbors.
- The China factor. The fact that the source of the project is in the CAS has the potential to bring the Indian and Chinese energy interests in direct conflict. China

has viewed the CAS region as a source for its own energy supply. Moreover, it also views this region as a gateway to accessing resources from the Middle East.[59] Recent Chinese acquisition of gas rights in Kazakhstan are indicators of Beijing's growing interest in the region.[60]

- Effect on relations with the USA. The USA has been an avid supporter of the TAPI pipeline. This pipeline is in concert with the US interest of isolating Iran because it presents a viable alternative to the IPI project. Ariel Cohen in his article has even postulated that the USA should actively support this project by way of ensuring funding and expertise. [61]

Analysis

The TAPI project has the potential to mitigate India's energy security concerns. The project meets the requirements of source diversification by providing gas as an alternative to oil as an energy source. Moreover, it also reduces India's dependence on oil and gas imports from the Middle East and the Persian Gulf. The access to cheap gas is also another major benefit to India. However, the security concerns due to the fact that the pipeline has to traverse through unstable regions in Afghanistan and Pakistan have raised the question of disruption of supply.

The pipeline serves to economically link both India and Pakistan. More significantly, it adds Pakistan as an important factor in India's ability to access energy sources overland from the CAS region. It also raises the possibility of providing Pakistan economic leverage on India, which may be contrary to India's interests. The pipeline raises the possibility of conflicting interests between India and China. The geographical

proximity of China to the CAS and its interest in the region give rise to the possibility of friction between India and China as they both strive to address their energy concerns.

Effect on India's National Security

- Assurance of supply. The assurance of supply is a critical element of India's energy security policy. Various analysts have postulated that, as India has to depend on energy imports for its continued economic and social growth; natural gas pipelines like the TAPI pipeline have a crucial role to play. Energy security has a direct impact on India's national security and thus the TAPI pipeline also has a critical affect on India's energy security.
- The Pakistan factor. The TAPI pipeline project has the potential to shape the relationship between India and Pakistan. It entails closer economic cooperation between the two neighbors, which in itself can serve as a precursor to increased social and political interaction between the two countries. It would also necessitate policy makers in the two nations to realign their traditional stances on outstanding bilateral issues due to the fact that they would share common interests. Additionally, since the pipeline has the potential to create economic opportunities in Pakistan's underdeveloped northern regions, it will add to Pakistan's political and economic stability.
- The China factor. The TAPI pipeline has the potential of bringing the two fast emerging global powers into potential conflict. The fact that energy security is an important element of national policy of both countries results in clashing national interests in the Caspian Sea basin. Given its geographical proximity to the region,

China would understandably intend to secure its energy needs from this area. India, on the other hand, is also pursuing a policy of source diversification and hence has interest in tapping into the resources in the CAS.

- Effect on relations with the USA. The TAPI pipeline has a positive influence on India's relations with the USA primarily due to the fact that it reduces India's dependence on energy imports from Iran. Thus, various analysts like Ariel Cohen and Herberg have advocated that the pipeline has a crucial role to play in Indo-US relations since it removes the possible differences over the IPI pipeline issue. The pipeline is also in the US interest because it has the potential to thwart any perceived Russian and Chinese domination of the energy resources from the Caspian Sea region by diverting these to South Asia. Thus, the USA has another strong reason to support this pipeline.

Analysis

The TAPI pipeline has a tremendous impact on the energy security of India because it enables India to explore new sources in the CAS. Moreover, it also provides source diversification and reduces the dependence on energy imports from the Middle East and the Persian Gulf region. It would also provide India with access to cheap energy and improve economic ties with Pakistan. More significant is the fact that this pipeline has the potential to improve relations between India and Pakistan. The successful implementation of this pipeline requires both countries to work together and provides a platform for the improvement of bilateral ties.

The pipeline has the potential to bring about political and economic stability in Pakistan's northern regions. This could be beneficial for India since a stable Pakistan is in

India's interests. On the other hand, the fact that India's access to the energy from the CAS is routed through Pakistan could be cause for concern for India since it would provide Pakistan with an important economic tool for leverage against India.

The pipeline also gives rise to the possibility of a clash of interests between India and China due to interests of both energy hungry economies in the CAS region. Moreover, China, with its greater economic clout, can reduce India's influence in the region and deny access to the much-required energy imports from this region. This could lead to India aggressively wooing the CAS and having to compete against the Chinese tools of national power. This has a significant impact on India's national security.

Perhaps the most beneficial effect of this pipeline is the potential to improve India's relations with the USA. It is significant due to the fact that it removes the possible dependency on imports from Iran, thus removing a possible irritant in Indo-US relations. Moreover, it also helps to counter growing Russian influence over the strategically vital Caspian Sea region.

The Myanmar – Bangladesh – India (MBI) Natural Gas Pipeline

The Indian energy policy of source diversification led it to *look east* in order to tap the resources available in its immediate neighborhood - South East Asia. As a result of this, in early 2005 the Indian government struck a deal with the governments in Myanmar and Bangladesh for the import of natural gas through an overland pipeline originating in the A1 offshore gas reserves near Shwe in Myanmar.[62] The pipeline would then pass through the Cox Bazaar area in Bangladesh and then on to Kolkata in India. The 950 km pipeline was to originally cost US$2 billion to construct.[63]

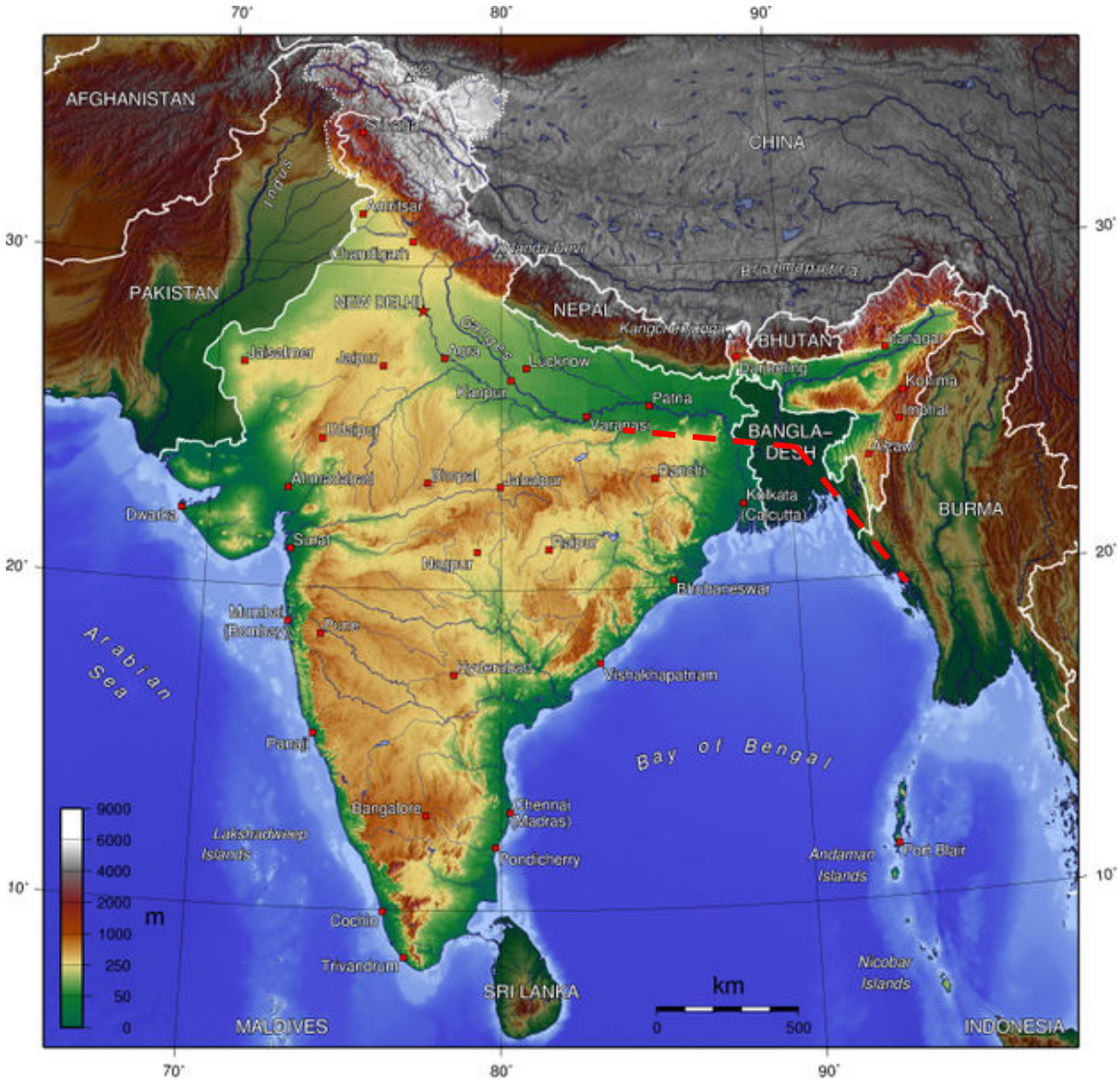

Figure 8. Map of Proposed Route of the MBI pipeline.
Source: Wikipedia (for map only, Pipeline route depicted by red dashes drawn by the author of this thesis).

The implementation of the project faced two major hurdles. The first hurdle came from the Bangladesh demand for transit rights for import of goods and services through India from Nepal and Bhutan to Bangladesh.[64] Consequent to the political stalemate, the government of Myanmar accorded exploration rights to Chinese oil and gas exploration companies in the very same A1 reserves from which gas was to be exported to India.[65]

However, India was accorded imports from A2 reserves in the Andaman Sea. This, however, would increase the length of the pipeline and add to the cost. The Indian government even considered the option of bypassing Bangladesh and diverting the pipeline to pass through India's relatively energy starved and inaccessible North East states.[66] However, this would increase the length of the pipeline from 950 km to 1550 km and thus add to the cost.[67] As a result of the growing Chinese influence in Myanmar and the political and cost impediments, the project seems to have stalled for the time being, despite Myanmar's repeated offers to sell gas to India.

Effect on India's Energy Security

- Assurance of supply This pipeline was in consonance with India's policy to achieve source diversification. The fact that the pipeline was originating from the gas reserves in Myanmar where India's ONGCVL had secured controlling interests augured well for future investments in Myanmar. Furthermore, it would have benefitted India given the fact that IPI and TAPI pipelines were far from completion. Finally, the pipeline had the potential to provide assurance of supply due to its shorter route with point of origin being in India's immediate neighborhood, thus obviating fears of supply disruption.
- The Pakistan Factor This pipeline was unique in the sense that it was located on India's eastern side and ruled out any direct involvement of Pakistan in the deal. Thus, Pakistan had no role to play in India's energy security had this project materialized.
- The China factor The Indian government promised additional benefits to Myanmar in the form of soft credit of US $20 million and the construction of a

power plant.[68] Despite these potential benefits, the Myanmar government preferred to sell the rights to PetroChina, a Hong Kong registered Chinese company.[69] This was a clear indication of increasing Chinese influence in the Indian Ocean region. This also endorses the view that India and China would undeniably face conflicting interests in their search for energy security.

- Effect on relations with the USA The suspect human rights record of Myanmar has been the source of less than friendly relations between it and the USA. Consequently, the fact that such a deal would bolster the economic strength of the ruling military junta in Myanmar could be a cause of concern to the USA.

Analysis The implications of this pipeline on India's energy security could be tremendous. It would provide India with a viable alternative to accessing overseas gas, despite the delays to the much larger IPI and TAPI pipelines. Though this project rules out any influence of Pakistan in India's energy security and provides assurance of supply, it also validates the fact that India and China face increasing competition as they both strive to achieve energy security. Moreover, the pipeline project has the potential to be in conflict with US interests due to their less than cordial relations with Myanmar.

Effect on India's National Security.

- Assurance of supply The fact that this pipeline was to provide India with assurance of supply was a benefit for India's energy security. An article in Power and Interest News Report (PINR) has speculated that given the development – security nexus, the pipeline could have tremendous benefits for India by boosting economic development in India's insurgency affected North–Eastern states.[70]

- The Pakistan factor The pipeline ruled out Pakistan playing a direct role in India's energy security. Thus, on the one hand it had benefits for India's national security by denying Pakistan critical economic leverage, as is in the case of the IPI and TAPI pipelines. On the other hand, the fact that there was no Pakistan involvement or interest in the project denied any potential for shared economic interest and, in effect, ruled out a platform for bilateral dispute resolution.
- The China factor The project has heightened concerns that India has failed to secure energy sources in its own backyard due to growing Chinese influence in the region. The pipeline had tremendous potential for greater integration and increased economic and military cooperation between India and Myanmar. However, Indian interests suffered in the face of the greater diplomatic and economic clout of China.
- Effects on relations with the USA There is no clear literary evidence of the potential impact of this project on Indo-US relations. However, given the dismal human rights record of the ruling junta in Myanmar, it is safe to assume that this project may possibly not been very dear to US interests. On the other hand, growing Chinese influence in the region may well bring India and the USA closer together as they seek to secure their own interests in the region.

Analysis The pipeline has a tremendous impact on India's national security. It not only addresses India's energy security concerns but also has the potential to boost economic growth in India's North – Eastern states which have been relatively underdeveloped. Moreover, it also presented the potential for closer cross border counter insurgency efforts between India and Myanmar. Thus, there could have been the potential

for India to utilize the economic, diplomatic and military tools of national power to address the secessionist threat in its northeast. The economic benefits for Bangladesh could also have been potentially beneficial to India. They would have added stability to Bangladesh and reduced the problem of illegal Bangladeshi migrants to India. Moreover, with recent reports of cross border insurgency from Bangladesh the project could have been a prelude to increased military ties between the two countries. Ruling out the Pakistan factor from India's energy security ventures could be potentially beneficial because it would deny Pakistan any economic leverage over India.

Another significant effect of the project is in context of its potential to reduce growing Chinese influence in the Indian Ocean region. Subsequent to Chinese success in securing gas from Myanmar, their influence in the region has grown resulting in their developing the port of Sitwe and developing a radar station in Myanmar. This region is crucial for India's economic and strategic interests since it has vast gas reserves, is home to the crucial Straits of Malacca and is also the region where India conducts its missile and space tests. This has heightened Indian fears that China could use its radar station off the coast of Myanmar to monitor India's missile and space development programs.

On the other hand, India's failure to secure the deal could be a precursor to closer Indo-US relations. The failure of the deal to be implemented could be a reason for US interest in speeding up the nuclear energy aid to India. Moreover, the growing Chinese influence in the Indian Ocean region could motivate India to partner with the US to counter this threat.

Summary of Analysis

The preceding analysis clearly establishes the fact that India has growing energy requirements and energy security is indeed a critical element of India's national security. The case study analysis help determine the effect of India's energy security on her national security. The following tabulated summaries of the case study analysis provide an overview of the risks associated with the pipeline projects and the interplay of the four independent variables and their effect on India's national security.

Table 3. Summary of the Three Pipeline Projects

Pipeline	Distance of pipeline (in km)	Estimated cost (in US $)	Gas Transported (mmscmd)	Sensitive region	Sensitive distance (in km)
IPI	2,775	$7.5 Billion	90	Balochistan(Pakistan)	760 (~28%)
TAPI	1680	$ 7.4 Billion	12.5	Afghanistan and Pakistan	1200 (~58%)
MBI	950	$ 2 Billion	33.5	Bangladesh and North-East India	289 (Bangladesh) + 200 (India) (~52%)

Source: Created by the Author (Data of Sensitive distance taken from The Hindu, "Promise of transborder gas pipelines," available at http://www.thehindu.com/2006/05/08/stories (accessed 13November 2008).

Table 4. Overview of the Effect of India's Energy Security on her National Security

Factor / Project	Assurance of supply	The Pakistan factor	The China factor	Effect on relations with the USA	*Net effect on India's National Security*
IPI	Assurance achieved subject to internal stability of Iran and Pakistan	Critical role. Pipeline could provide a platform for resolution of bilateral issues. Could provide Pakistan an economic leverage over India. Could help provide economic stability in Pakistan which is in India's interest	No direct role. Possible interest clash since China interested in securing energy from Iran. Conflicting interests could aggravate historical outstanding bilateral issues between India and China.	Detrimental ; contrary to US interests	*Provides energy security.* *Potential for resolution of bilateral disputes with Pakistan.* *Possible conflict of interests with China.* *Detrimental effect on Indo-US relations.*
TAPI	Assurance achieved subject to internal stability of Afghanistan and Pakistan	Critical role. Pipeline could provide a platform for resolution of bilateral issues. Could provide Pakistan an economic leverage over India. Could help provide economic stability in Pakistan ; in India's interest.	No direct role. Possible interest clash since China interested in securing energy from CAS. Conflicting interests could aggravate historical outstanding bilateral issues between India and China.	In US interest since it steers India away from dealing with Iran. Also in US interest because helps mitigate growing Chinese and Russian influence over energy resources of the CAS.	*Provides India energy security.* *Potential for resolution of bilateral disputes with Pakistan.* *Possible conflict of interests with China.* *Could promote stronger Indo-US ties*

MBI	Assurance achieved subject to internal stability of Bangladesh and India's North-Eastern region.	No role.	Critical role. Establishes China as a strong competitor to India's energy interests. Re-affirms growing Chinese influence in the Bay of Bengal and the Straits of Malacca	Contrary to US interest of isolating the ruling junta in Myanmar. Possibility of stronger Indo-US ties to counter Chinese influence in the strategically vital Straits of Malacca.	*Failure to secure the deal seen as India's failure to use its tools of national power to compete with China.* *Economic benefits and stronger Indo-Myanmar ties could help India address insurgency in its North-Eastern states*

Source: Created by the Author of this thesis.

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CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The analysis in the preceding chapter leads to the conclusion that India's energy security requirements are colossal and bound to increase in the future. The analysis also clearly establishes the fact that India's energy security is indeed a vital element of her national security. The case study analysis helped us identify the effect of India's energy security on her national security, especially on India's regional relationships with neighbors and its relations with the USA. The case study analysis facilitates identification of the risks associated with overland Trans-National energy pipelines. This chapter shall provide an overview of the aforesaid risks and suggest options available to mitigate those risks. The chapter shall conclude with recommendations for further study.

India's Energy Security: Risks Identified and Options Available to Mitigate the Risks

The case study analysis in the previous chapter helps us identify the risks associated with the trans-national energy pipelines as a viable option for India's energy security. The risks are as enumerated below:

- The successful implementation of the IPI and TAPI energy pipelines is directly dependent on the internal stability of Iran and Pakistan in the former case and Pakistan and Afghanistan in the latter case. Should there be internal stability issues in the aforesaid countries, especially in the regions which fall along the pipeline route, the security of the pipeline itself shall be a major concern for India. More significant is the fact that

since the internal stability of other nations is outside India's control, there is not much India can do to mitigate this threat.

- The successful implementation of the MBI pipeline is dependent on the internal stability of Bangladesh, a factor which is again beyond India's purview. Even if India chooses the costlier option of bypassing Bangladesh by selecting the longer route through its North-Eastern region, the pipeline security shall still be a concern. However in this case India can take active measures to mitigate the security risk, most of the pipeline being in Indian territory.
- Both the IPI and TAPI pipelines provide Pakistan a major economic leverage over India. This could be a great risk in case of future conflicts between the two countries.
- India's failure to *'close the deal'* with Myanmar in the face of Chinese competition is also indicative of China's increasing influence in the Bay of Bengal. It also alludes to the fact that there may be a clash of national interests between India and China in the future.
- The energy pipelines in themselves are not adequate to meet all of India's energy security requirements. Together they would provide 136 mmscmd of natural gas as against a projected demand of 391 mmscmd in the period 2024-25. This constitutes only 35 percent of India's total natural gas requirements in that period.

- The pipelines and associated infrastructure are in themselves a security hazard. Securing these vital assets would require special assets and capabilities.

The risks identified hitherto for imply that there are genuine risks to India's energy security which would have an adverse effect on her national security. It is therefore necessary to develop certain options in order to mitigate the risks. A few options are enumerated as under:

- Since the internal stability of other nations (Iran, Pakistan, Bangladesh and Afghanistan) is beyond India's control, the best option available for India is that the economic benefits from the pipeline projects would help stabilize the concerned regions. Moreover the economic benefits from the projects being tremendous provide an added impetus to the transit countries to ensure security of the pipelines in their respective territory.
- Despite the risks associated the pipelines provide a tremendous economic platform for improvement of bilateral ties between India and its neighbors (Pakistan, Myanmar). Thus the opportunity to resolve bilateral issues could outweigh the risks involved.
- Improved bilateral ties with Pakistan could reduce the possibility of future conflicts. This would mitigate the threat of Pakistan possibly exploiting the economic leverage (due to the pipeline) it would have over India.
- India will have to develop a long-term strategy to exercise its tools of national power in order to secure its energy requirements. This could involve collaboration with China wherever possible but also should

provide viable diplomatic options to compete with the Chinese when required.

- Natural gas in itself will not be adequate to meet India's energy requirements. This can be addressed by pursuing a policy of energy mix, incorporating conventional energy sources, nuclear energy and NCES.
- India's domestic and overseas energy infrastructure development implies that its armed forces will have to develop the capacity to protect these assets. Thus India's armed forces may have to re-define their role. They may possibly have to operate across a wider area of strategic interest, thus necessitating enhancement of their strategic reach capability.

Recommendations

This study has endeavored to establish the effects of India's energy security on its national security. In context of the findings the following aspects are recommended for further research:

- India's energy policy needs to be redefined and globally competitive. More importantly, there is need to establish a far-sighted policy aimed at achieving energy security in the distant future. The focus should be on enhancing domestic capacity as well as securing overseas interests.
- India's energy policy should be flexible and accommodate the clashing interests of other major energy consumers like China. In this context the possibility of further joint Indo-China ventures to address the energy requirements of the two countries needs to be further explored.

- In context of the crucial role of Pakistan in India's success in accessing energy from the Middle East and the Central Asian states it is essential that the Indian policy makers redefine the policy with Pakistan. There is the need to exploit the potential benefits from joint cross border economic ventures like the TAPI and the IPI gas pipelines.
- The Indian Armed Forces and Internal Security Forces need to carry out a pragmatic capability analysis based on their re-defined global role. Shortfalls need to be identified and measures need to be initiated to progressively bridge the capability-requirement gap.

Conclusion

The study has clearly established the fact that India's energy security has a tremendous impact on her national security. Energy security is not only crucial for India's internal stability and social development; it also has the potential to redefine India's foreign policy. Moreover it also has the potential to redefine the role of India's armed forces. Thus it is imperative that conscious efforts be made by foreign and economic policy makers as well as military planners to develop a concerted policy to address India's energy security requirements as well protect the energy assets which will inevitably be developed in the future.

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